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10/575,429	04/10/2006	Hubert Gerard Jean Vroomen	NL 031233	3744

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EXAMINER	
ENTEZARI, MICHELLE M	
ART UNIT	PAPER NUMBER
2624	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/575,429	VROOMEN, HUBERT GERARD JEAN	
	Examiner	Art Unit	
	MICHELLE ENTEZARI	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

1. **Claim 3** is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 3 recites the limitation "said field of use". There is insufficient antecedent basis for this limitation in the claim, as no prior claim cites a “field of use”. For purposes of timely prosecution, Examiner interprets this to mean “said field of view” instead.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1, 2, and 6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Corby Jr et al. (US 5805289) in view of Petty et al. (US 20040128102 A1) in view of Powell et al. (US 4958306).

Regarding claims 1 and 6, Corby, Jr et al. disclose a method and system for measuring dimensions of an object (select structures and measure dimensions, abstract) by means of a digital camera (digital camera, abstract, see also fig. 2) provided with image processing means (laser imaging measurement system, col. 3, lines 60-65; fig. 2), with detection means for detecting points on the image (images are collected which show points common to the images, col. 4, lines 1-10; feature island, col. 4, lines 20-30; ID 2D target centers of visible targets, col. 4, lines 40-50), and with coordinate calculation means for calculating the coordinates of detected points on the image (coordinate measurement device provides 3D measured locations of targets, abstract), whereby the distance between a first detectable point and a second detectable point on the object is measured by making a first image comprising said first detectable point, then displacing the field of view of the digital camera, and subsequently making an other image comprising said second detectable point (several images collected with a number of points common to each of the images, location of the points can be calculated, col. 4, lines 1-10; two or more images, identify 2D target centers for each image, col. 4, lines 35-50; calculate location and orientation (pose) of camera for each overlapping image 55, 58, [indicates field of view is displaced in between], col. 4, lines 20-30 and fig. 1; calculate dimensions between a feature in

image set 1 and image set 2, col. 4, lines 60-65; determine distances between selected objects or points within an image, col. 6, lines 35-40), whereby the coordinates of said first detectable point on said first image and the coordinates of said second detectable point on said other image are calculated (coordinate measurement device, abstract; coordinate measurement machine (CMM) system record the 3D position of a reference probe touching the object surface at points of interest, col. 2, line 65 – col. 3, line 5; measures the actual world 3D coordinates of the target centers of the optical targets of the SRD using the CMM, each target point that was detected photogrammetrically also has absolute 3D coordinates in the indicated global CMM coordinate system, col. 4, lines 45-55; any point measured from image set 1 or 2 can be expressed in same global coordinates, col. 4, lines 55-60), and whereby the displacement of said field of view is determined in order to calculate said distance between said first detectable point and said second detectable point (angles and location of camera used to find relative 3D location of common points, col. 4, lines 5-10), characterized in that two or more overlapping images are made by the digital camera (several overlapping images are collected, col. 4, lines 1-5), whereupon corresponding detectable points in the overlapping part of overlapping images are detected (number of points common to the images, col. 4, lines 1-10).

Corby Jr et al. do not explicitly disclose that after which the coordinates of said corresponding detectable points in both images are calculated in order to determine the displacement of said field of view.

Petty et al. teach coordinates of said corresponding detectable points in two images are calculated in order to determine the displacement of said field of view (Any one imaging device has a maximum angle of view which determines the size of field of view, large fields cannot be captured in a single image, a first image is captured at position 2601 and a second image is captured at position 2602, each of the first and second images include a common reference point 2603, data from those images to be coordinated to produce a single data set for the combined field of view, capture overlapping fields of view with at least one adjacent camera wherein common reference points can be determined in each overlapping field of view, an area larger than the field of view of a single camera can be mapped, [0309]-[0312]).

It would have been obvious to combine the concept of using coordinates of said corresponding detectable points in two images are calculated in order to determine the displacement of said field of view as taught by Petty et al. with the invention of Corby Jr et al., because this increases the size of the effective field of view and can even sometimes anticipate motion of an object (Petty et al., [0312]). Petty et al. further teach an extensive list of applications ([0301]-[0308]).

Petty et al. do not explicitly teach using only one camera. A third reference is therefore provided to provide more detail as to how this could work in an invention originally designed for two cameras.

Powell et al. teach a single camera can be used, rather than two cameras, in which overlap frame pixel signals represent a view of the same surface from a spaced location and an inclined angle can be used, in order to obtain the elevational profile (col. 10, lines 1-15).

It would have been obvious at the time of the invention to use only one camera as taught by Powell et al. in the invention of Colby Jr et al. and Petty et al., because Powell et al. are also in the art of object/object size detection (abstract), Powell et al. cite additional advantages of being able to implement the invention in a moving vehicle, and providing accurate and reliable information regarding both the longitudinal and transverse profile of the pavement as well as distress features (col. 2, lines 35-55), and because fewer cameras would require less space and money to implement.

Regarding claim 2, Corby Jr et al., Petty et al, and Powell et al. disclose the method as claimed in claim 1. Petty et al. further teach determining the pixel count between reference marks to determine vertical movement of camera (col. 7, lines 10-15), and a single camera view of the same surface at an inclined angle (col. 10, lines 5-15); and frames from undeflected and vertically moved camera are compared (col. 17, lines 45-65).

3. **Claim 3 is** rejected under 35 U.S.C. 103(a) as being unpatentable over Corby Jr et al. (US 5805289) and Petty et al. (US 20040128102 A1) and Powell et al. (US 4958306) as applied to claim 1 above, further in view of Qian et al. (US 6721454 B1).

Regarding claim 3, Corby Jr et al., Petty et al, and Powell et al. disclose the method as claimed in claim 1.

Corby Jr et al., Petty et al, and Powell et al. do not explicitly disclose that said field of use is displaced by moving the object to be measured.

Qian et al. teach a camera moves to track a moving object of interest (col. 4, lines 1-10).

It would have been obvious at the time of the invention to one of ordinary skill in the art to combine the tracking of the object of interest as taught by Qian et al. with the invention of Corby Jr et al., Petty et al, and Powell et al., as this would be useful any time the invention is tracking an object in motion.

4. **Claim 4 is** rejected under 35 U.S.C. 103(a) as being unpatentable over Corby Jr et al. (US 5805289) and Petty et al. (US 20040128102 A1) and Powell et al. (US 4958306) as applied to claim 1 above, further in view of Yano et al. (US 6031941).

Regarding claim 4, Corby Jr et al., Petty et al, and Powell et al. disclose the method as claimed in claim 1.

Corby Jr et al., Petty et al, and Powell et al. do not explicitly disclose the field of view is seen by the digital camera through an adjustable optical device

Yano et al. teach view point displacement calculation takes into account the rotational displacement amount of image sensing lens (col. 6, lines 15-25).

It would have been obvious at the time of the invention to one of ordinary skill in the art to take the lens into account in determining the field of view, as taught by Yano et al., with the invention of Corby Jr et al., Petty et al, and Powell et al., because it is well known in the art that when using a digital camera, the field of view will be affected by the lens characteristics.

5. **Claim 5 is** rejected under 35 U.S.C. 103(a) as being unpatentable over Corby Jr et al. (US 5805289) and Petty et al. (US 20040128102 A1) and Powell et al. (US 4958306) as applied to claim 1 above, further in view of Takiguchi et al. (US 6243103).

Regarding claim 5, Corby Jr et al., Petty et al, and Powell et al. disclose the method as claimed in claim 1.

Corby Jr et al., Petty et al, and Powell et al. do not explicitly disclose that a number of overlapping images is processed, whereby all images show a detectable line of the object.

Takiguchi et al. teach the second overlapping portion is roughly obtained by magnifying the first overlapping portion, edge pixels are extracted in the roughly obtained second overlapping portion as corresponding points, a mapping relationship between the first and second images is obtained on the basis of a group of extracted corresponding points (col. 2, lines 55-65).

It would have been obvious at the time of the invention to combine the edge detection in multiple images as taught by Takiguchi et al. in the invention of Corby Jr et al., Petty et al, and Powell et al., as detecting corresponding pixels/overlapping portions of images is known to be difficult (Takiguchi et al., col. 1, lines 55-65), and edges are one of the most recognizable features that could be targeted for recognition.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MICHELLE ENTEZARI whose telephone number is (571)270-5084. The examiner can normally be reached on M-Th, 7:30am-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on (571)272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michelle Entezari/
Examiner, Art Unit 2624

/Vikkram Bali/
Supervisory Patent Examiner, Art Unit 2624